

RESPONSE TO COMMENTS ON THE TENTATIVE DECISION DOCUMENT
AND DRAFT PERMIT

FOR

THE JOHN M. ASPLUND WATER POLLUTION CONTROL FACILITY
ANCHORAGE WATER AND WASTEWATER UTILITY
ANCHORAGE, ALASKA

Prepared by:

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301(h) REVIEW TEAM, REGION 10

September 1985

INTRODUCTION

NPDES Permit No.: AK-002255-1
Municipality of Anchorage
(John M. Asplund Water Pollution Control Facility)

The EPA, Region 10 301(h) Review Team's Tentative Decision Document (TDD; titled "Analysis of the Section 301(h) Secondary Treatment Variance Application for the John M. Asplund Water Pollution Control Facility") and the draft permit referenced above were made available for public comment for a 30-day period (January 17 - February 15, 1985).

The TDD analyzed the merits of the application and summarized the findings, conclusions, and recommendations of EPA, Region 10, regarding the compliance of the applicant's proposed discharge with criteria set forth in Section 301(h) of the Clean Water Act as implemented by regulations contained in 40 CFR Part 125, Subpart G. On the basis of the findings presented in the TDD, EPA determined that the proposed discharge for the Anchorage Water and Wastewater Utility's publicly owned treatment works will comply with the requirements of Section 301(h) subject to state concurrence or waiver of concurrence. This determination and the facts upon which it was based required no revision based on comments made during the public notice period. Therefore, the analyses contained in the TDD serve as the basis for the final decision.

In particular, these analyses demonstrate that the discharge will not violate water quality standards, will be adequately diluted and dispersed, will not interfere with public water supplies, will insure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife within and beyond the zone of initial dilution, will protect recreational activities, will not affect other point and nonpoint discharge sources, and will comply with applicable provisions of other state, local, and federal laws.

The only comments received during the public notice period were from the Municipality of Anchorage (the "Municipality") and from the Alaska Center for the Environment (ACE). Within several days of the close of the comment period, comments were received from the U.S. Fish and Wildlife Service (USFWS). EPA has elected to respond to these as well.

As part of the permit issuance process, comments were submitted by EPA's Office of Research and Development (ORD) and the EPA 301(h) Task Force. The Municipality also submitted a response to ORD's comments. Comments made by ORD, the Task Force, and the Municipality largely concern the monitoring program proposed in the draft permit. Further discussions with ORD, the Task Force, and the Municipality clarified these comments and resulted in adjustments to the final permit.

This document incorporates comments made on the TDD and the draft permit. Section I includes the response to comments made by ACE and USFWS. Sections II-V address comments made on Part I. of the final permit (Effluent Limitations, Monitoring Requirements, Additional Requirements, and Compliance Schedules), specify the objectives and rationale, and discuss the changes incorporated into the final permit.

Four documents received contained a substantial number of comments. Comments in each document were assigned the following reference numbers:

<u>Document</u>	<u>Date Received</u>	<u>Reference Numbers</u>
Review Comments on Anchorage's Tentative 301(h) Waiver Monitoring Requirements (Received from the Municipality)	February 15, 1985	1-1 through 1-38
Anchorage Permit, Tentative Decision, and Fact Sheet (Received from ORD)	March 14, 1985	2-1 through 2-35
MOA Responses to Comments from ORD (MOA = Municipality of Anchorage)	April 15, 1985	3-1 through 3-12
Task Force Comments on Draft Monitoring Program/Tentative Revised Approval (Task Force = EPA 301(h) Task Force which reviews decisions and permits)	April 16, 1985	4-1 through 4-33

These numbers appear throughout this Final Decision Document in parentheses. They can be used to locate the particular comment under discussion by referring to the four documents listed above, which appear (with reference numbers added) as appendices.

Additional comments received from the Municipality, ORD, and the Task Force were incorporated into this document and the final permit was adjusted accordingly.

SECTION I

RESPONSE TO COMMENTS FROM ACE AND USFWS

ACE stated that two studies released in January 1985 "need to be evaluated as to how they pertain to the waiver." Both of the studies (Settleable Solids: Ecological and Regulatory Considerations [USFWS]; and Turbidity in Freshwater Habitats of Alaska [Alaska Department of Fish and Game]) address freshwater habitats and the impact of transported particles on stream and lake productivity. The findings of either study do not influence EPA's decision that suspended solids (SS) discharged from the John M. Asplund Facility will comply with applicable water quality standards. The SS concentrations that occur naturally in Knik Arm of Cook Inlet are so large that SS in the effluent are predicted to have no substantial impact in the receiving water or depositional areas. The discharge is predicted actually to decrease ambient SS concentrations by 1.9 to 3.8% (as discussed in the Tentative Decision Document [TDD] which accompanied the draft permit).

To validate these predictions, the Permit requires a monitoring approach that will allow EPA to examine the transport of suspended particles discharged in the effluent and to determine whether detectable changes occur in the receiving water or mudflats. Specifically, the permit requires monitoring of the effluent for both settleable solids and suspended solids, turbidity measurements in the receiving water, and measurements of total volatile solids in depositional, intertidal areas.

USFWS commented on the Toxic Controls Program of the Tentative Decision Document. This comment stated the concern that copper and cyanide levels at the point of discharge can be "in excess of those required for aquatic life protection." Federal regulations allow for a zone of initial dilution (ZID; 40 CFR 125.58(w)) which is the region of initial mixing surrounding the end of the diffuser ports. Under 40 CFR 125.61(a)(1), the applicant's outfall and diffuser must provide adequate initial dilution to meet all applicable water quality standards at and beyond the boundary of the ZID.

As discussed in the TDD, the dilution ratio of 25:1 used in all analyses throughout the TDD is a very conservative estimate (Section IV - Application of Statutory and Regulatory Criteria; Part B - Physical Description of Discharge; Subpart 2 - Zone of Initial Dilution). After this ratio is applied to the maximum recorded effluent concentrations of copper and cyanide, no violations of EPA saltwater aquatic life criteria for those pollutants are expected at the edge of the ZID. Because the criteria are not exceeded under worst-case conditions, when a conservative dilution ratio is used, EPA believes marine life at and beyond the ZID boundary will not be impacted by discharge of current levels of copper or cyanide in the Municipality's effluent and, therefore, will be in compliance with CFR 125.61(c)(2).

Under 40 CFR 125.61(c)(3), conditions within the ZID must not contribute to extreme adverse biological impacts such as destruction of distinctive habitats of limited distribution, the presence of disease epicenters, or the stimulation of phytoplankton blooms which have adverse effects beyond the ZID. Furthermore, 40 CFR 125.61(c)(4) provides that discharges into saline

estuarine water: (1) must not cause benthic populations within the ZID to differ from those immediately beyond the boundary of the ZID; (2) must not interfere with estuarine migratory pathways within the ZID; and (3) must not result in the accumulation of pollutants or pesticides at levels which adversely affect biota within the ZID. EPA has discussed each of these points in detail in Section IV.D. of the TDD. Because the discharge area is a nondepositional, high-energy environment with fast currents, tremendous mixing, and an impoverished fauna, EPA has determined the requirements of 40 CFR 125.61 will be met.

In particular, because initial mixing will be completed within seconds, EPA concludes that discharged copper or cyanide concentrations under infrequent, worst-case conditions will not have any detectable effect on biota within the small area (28.5 m x 28.5 m) of the ZID nor cause any adverse effects beyond the ZID. As a check on this conclusion, the permit includes frequent monitoring of cyanides and copper (one of the Heavy Metals) in the influent, effluent and sludge. This monitoring effort will allow EPA to determine whether these two pollutants are discharged at levels that may violate aquatic water quality criteria.

USFWS also discussed the statement in the TDD (Section VII - Toxics Control Program; Part A - Chemical Analysis) that "six priority pollutants and one pesticide that were listed by the applicant as not detected could have exceeded EPA water quality criteria following an initial dilution of 25:1." USFWS suggested that the underlying implication of this statement is that "potentially hazardous chemicals are present in the Municipality's effluent which would require a more stringent level of control prior to discharge, before dilution."

These seven chemicals could exceed water quality criteria only if they were present at levels close to the detection limits. Previous analyses of the effluent suggests that such levels are unlikely, because no other toxic pollutants or pesticides have been shown to exceed water quality criteria following dilution. Therefore, EPA has determined that the present lack of information on the seven undetected chemicals poses a negligible threat to aquatic life. Nevertheless, the final permit requires pollutant and pesticide analyses to be repeated using more stringent detection limits.

The final permit also specifies a frequency of at least annual monitoring (both wet and dry weather) of influent and effluent for toxic pollutants and pesticides. Furthermore, the results of the first analysis for toxic pollutants and pesticides will be available within 3 to 6 months of final permit issuance. Accordingly, EPA concludes that the monitoring program will describe the chemical composition of the effluent in detail and will, therefore, address USFWS's concern that accurate information be provided on "the types, levels, and chemical state of hazardous substances that could be discharged in potentially hazardous levels."

USFWS requested that analyses of effluent be of "samples collected at the point of discharge, before any dilution." While this language was not used in the TDD, it was clearly implied in the draft permit under the Toxics Control Program (Part I.B.7. of the final permit) which stated that "Effluent samples shall be collected after effluent leaves the primary sedimentation tanks" and "Detection limits of the analytical methods used must allow the Director to

determine whether receiving water quality criteria are met." Furthermore, in Part I.B.7.a.(3) of the final permit the permittee is directed to identify the next ten highest peaks on the ion plot using GC-MS analytical technique. This requirement will alert EPA to the presence of potentially hazardous chemicals that are not designated pursuant to Section 307(a)(1) of the Clean Water Act.

EPA has carefully considered the suggestion by USFWS that the granting of a variance from secondary treatment requirements to the Municipality is a premature action. Because the present level of threat to aquatic life is minimal, and yet is subject to frequent, detailed, ongoing monitoring, EPA concludes that its action to grant such a variance is not premature.

SECTIONS II-V

EFFLUENT LIMITATIONS, MONITORING REQUIREMENTS, ADDITIONAL REQUIREMENTS, AND COMPLIANCE SCHEDULES FOR THE MUNICIPALITY OF ANCHORAGE'S JOHN M. ASPLUND WATER POLLUTION CONTROL FACILITY:

Objectives; Program and Rationale; Response to Comments Made on the Draft Permit; and Changes Incorporated into the Final Permit

INTRODUCTION

As part of its NPDES permit containing a Section 301(h) variance pursuant to the Clean Water Act for its John M. Asplund Water Pollution Control Facility, the Municipality is required to implement a monitoring program as set forth in 40 CFR 125.62. Part I. (Effluent Limitations, Monitoring Requirements, and Compliance Schedules) of the draft permit for the Municipality has been reorganized in the final permit as follows:

<u>Part in Final Permit</u>	<u>Former Part in Draft Permit</u>
A. Effluent Limitations	A.1.
B. Monitoring Requirements	
1. Overview	B.1.
2. Data Coding and Submission Requirements	B.1.
3. Definitions	A.3.
4. Influent, Effluent, and Sludge Monitoring Requirements	A.2.
5. Water Quality Monitoring Program	B.2.
6. Biological Monitoring Program	B.3.
7. Toxics Control Program Monitoring Requirements	B.4.,5.
8. Summary Tables	B.6.
C. Additional Requirements	(new heading)
1. Construction	C.1.
2. Toxics Control Program	C.2.,II.E.,III.I.
D. Compliance Schedules	
1. Construction	C.1.
2. Toxics Control Program	(new part)
3. Monitoring Reports	(new part)

Sections II-V supplement the final permit. They contain the specific objectives and rationale used to design the Municipality's final monitoring program in keeping with the concerns and conclusions reached in the Tentative Decision Document. They also address comments made on the monitoring program in the draft permit and explain the changes made between the draft and final permit.

SECTION II

EFFLUENT LIMITATIONS (Final Permit = Part I.A.)

Basis for Limitations

As discussed in the Fact Sheet which accompanied the draft permit, this part of the final permit sets the effluent limitations based on information contained in the Municipality's 301(h) application and receiving water criteria specified in the Alaska Water Quality Standards, and the 301(h) regulations. These limits also take into account previous permit requirements and past performance of the Municipality's primary treatment facility.

-BOD₅, SS, pH, and Flow

Pollutant limits for Biochemical Oxygen Demand (BOD₅) and suspended solids (SS) are expressed in terms of mass loadings (lb/day) and concentrations (mg/l). These limits insure that dilution will not be used as a substitute for treatment (40 CFR 122.45 (f)). Accordingly, detailed flow requirements are not necessary (2-19). Furthermore, because the maximum monthly average flow is used for calculations of all mass loadings, the weekly and daily maximum loadings are conservative limits.

Analyses to detect any environmental impacts due to BOD₅, SS, or pH concentrations in the effluent are based on expected average or worst-case flows (as appropriate) and on requested concentration limits. The monthly average flow limit of 44 mgd is based on trend analysis of 1980-1984 Discharge Monitoring Report (DMR) data. This limit is included in the permit because it is the basis for calculating the mass loadings (lb/day) for BOD₅ and SS. Plant expansion is expected to increase the capacity to handle average daily flow from a present level of 28 mgd (as reported in the Municipality's 301(h) application [2-20]) to 58 mgd and to increase the capacity to handle maximum daily flows from a level of 38.8 mgd to 84.5 mgd (2-18). These levels may not be reached during the permit term because maximum daily flows have not exceeded 54 mgd (1979-1984 DMR data). The worst-case level of 84.5 mgd was used throughout the analyses of the impacts of the discharge on DO, SS, and pH in the receiving water.

The original tentative approval of September 8, 1981 provided for a monthly average flow of 33.4 mgd and a mass emission rate of 27,900 lb/day for solids. The revised tentative approval (January 16, 1985) provides for an increase in monthly average mass emission rate of solids to 36,720 lb/day. This increase is due to the change in expected end-of-permit maximum monthly flow from 33.4 mgd to 44 mgd as a result of updating calculations made in 1981 for 1984. SS concentration limits remained at 100 mg/l in both original and revised tentative approvals. The 32% increase in flow between the 1981 decision and the present decision will not affect water quality (dissolved oxygen, turbidity, pH), biota (balanced indigenous populations), or recreational activities because all analyses which showed no impacts on these parameters, as reported in the Tentative Decision Document, were based on maximum flows of 84.5 mgd. Therefore, the increase in mass emission rate of solids in the final permit continues to allow for compliance with 301(h) criteria (4-1).

-Total Residual Chlorine and Fecal Coliform Bacteria

Effluent limits of 350 fecal coliforms (FC, measured as MPN/100 ml) as a monthly average (geometric mean) and 750 FC as a weekly average were required in the Municipality's draft permit. These limits were chosen so that the State of Alaska's most stringent water quality standard of 14 FC (geometric mean of 5 samples collected within 30 days, with no more than 10% of the samples exceeding 43 FC) would be met at the boundary of the ZID, following a dilution of the effluent of 25:1. Thus, these limits in the draft permit insured that FC standards would be met within a distance of approximately 30 m from the outfall.

So that the discharged effluent would not contaminate the shoreline and affect recreational uses of Knik Arm, the Municipality had been directed by the State of Alaska in 1982 to maintain residual chlorine (RCl_2) levels between 1.2 mg/l and 2.5 mg/l (Amendment to the Certificate of Reasonable Assurance of NPDES Permit No.: AK-002255-1; letter from ADEC to the Municipality, May 27, 1982). Inspection of data contained in the Municipality's DMRs indicates this level of chlorination has successfully prevented discharge of high FCs. Annual average levels of RCl_2 from 1980 to 1984 ranged from 1.14 mg/l to 2.44 mg/l, and monthly average levels ranged from 0.4 mg/l to 2.8 mg/l. During the period from January 1980 to May 1985, FCs exceeded a monthly average of 350 six times (out of 61 reports) with only one violation since July of 1981. It is clear that the dosage of 1300 lb chlorine/day (letter from the Municipality to EPA; April 23, 1982) has been sufficient to maintain low bacterial concentrations within a very small (approximately 30 m from the outfall) mixing zone.

However, maintenance of these low FC levels has meant that a large mixing zone has been required so that water quality standards of 2 ug/l for RCl_2 can be met. This pollutant is of concern because it exerts adverse effects on fish even at extremely low concentrations. The size of the mixing zone for RCl_2 has been estimated by the Municipality to be 890,000 m^2 (Technical Memorandum Point Woronzoff Outfall-Chlorine Residual Predictions; letter from the Municipality to ADEC; June 1, 1984). EPA has examined this mixing zone and the relationship between RCl_2 and FC, and addressed whether a reduction in size is achievable by reducing the effluent RCl_2 concentration.

The minimum sizes of the mixing zones needed to achieve compliance with Alaska State water quality standards of 14 FC and 2 ug/l RCl_2 are a function of the effluent concentrations of FC and RCl_2 which are inversely proportional to each other. The maximum acceptable sizes of these mixing zones are dictated by concern for potential impacts within the area pre-empted by the mixing zones, especially impacts on recreational use (caused by FC) and migrating salmonids (caused by RCl_2).

Because chlorination to reduce FCs involves addition of a known pollutant, RCl_2 , EPA has chosen to include a limit for this pollutant in the final permit. To determine this limit, EPA analyzed available data and reviewed available analyses and modeling efforts. EPA determined that a limit of 1.2 mg/l of RCl_2 in the effluent will substantially reduce the area of impact in Knik Arm while insuring that recreational uses are protected.

As part of its revised application, the Municipality provided a technical memorandum (Chlorine Residual Prediction; letter from the Municipality to ADEC; June 1, 1984) demonstrating that a RCl_2 level of 2 ug/l could be met by a mixing zone of 890,000 m^2 . This mixing zone was approved by ADEC on March 26, 1985.

By setting the more stringent RCl_2 limit of 1.2 mg/l rather than 2.5 mg/l, EPA will insure that the area of impact will be substantially reduced (i.e., by more than 50%). Furthermore, sampling for RCl_2 in the receiving water is required in the final permit. Samples will be collected in the first year of the permit during the cruises which follow drogues released above the outfall during various tidal stages. This approach will allow EPA to examine the decrease in RCl_2 with distance from the outfall and thereby to delimit the area of impact. Because such detailed sampling will be conducted, and because a much smaller area will be exposed to RCl_2 impact, EPA concludes that limiting RCl_2 in the effluent to 1.2 mg/l will prevent unreasonable degradation of the receiving water due to chlorination of the effluent by the Municipality.

In its consistency determination of February 21, 1984 and its follow-up determination of March 26, 1985, ADEC approved the ZID as the mixing zone for FC, thus limiting mixing to a distance of 30 m. However, the area of greatest concern in Knik Arm is the shoreline, where high FCs could impair recreational uses such as shellfish harvesting. The minimum distance from the diffuser to the shoreline is 245 m. Drogue studies indicate that because of the currents, wastewater is likely to contact the shoreline only after traversing a distance of 750 m (R.Hoffman; personal communication, July 9, 1985). Using 245 m and 750 m as worst-case and conservative distances, and a conservative model analysis of dilution with distance (Motz-Benedict Model; L.Hornsby, Tetra-Tech, personal communication, July 3, 1985), effluent concentrations of FC would have to exceed 868 FC and 1820 FC before the state standard of 14 FC would be violated onshore. Using the Link-Node farfield modeling results, these effluent FC concentrations become 1600 FC and 4720 FC, respectively. EPA concludes that an effluent limit of 850 FC (monthly average, with 10% of the samples not to exceed 2,600) will insure that the most stringent state standards will be met at the edge of a mixing zone with a radius of 245 m, and therefore, that shoreline recreational uses will be protected.

EPA also concludes that this limit can readily be met concomitant with the residual chlorine limit. Model analyses of DMR and 1983 plant data indicate a level of 850 FC is unlikely to be exceeded even if RCl_2 levels are as low as 0.9-1.0 mg/l.

Changes Made to the Draft Permit

The effluent pH limits have been altered at the request of the Alaska Department of Environmental Conservation from the range of 6-9 units to the range of 6.5-8.5 units. Data from DMRs (1979-1984) indicate that the Municipality will be able to meet these more stringent requirements; in the five-year period, pH never exceeded 8.0 units and was reported below 6.5 as the monthly minimum only twice, and for both those times, the pH was 6.4).

As discussed above, the permit requires maximum monthly averages of 850 FC MPN/100 ml (geometric mean of at least 5 samples; not more than 10% of the samples to exceed 2,600 FC MPN/100 ml) and 1.2 mg/l total residual chlorine. The increase in FC still protects recreational use of the shoreline yet allows the maximum chlorine residual level to be reduced by more than half.

At the state's request, descriptions of the designated mixing zones for fecal coliform bacteria (circle with a radius of 245 m centered on the diffuser) and for total residual chlorine (approximately three-fourths of a circle centered on the diffuser with a radius of 600 m) are included in the final permit. The final permit also allows for future reductions in the size of the RCI_2 mixing zone and/or the RCI_2 effluent limit.

SECTION III.

MONITORING REQUIREMENTS (Final Permit = Part I.B.)

OVERVIEW (Final Permit = Part I.B.1.)

Objectives

The objective of the overview is to focus the strategy of the monitoring requirements specified in Parts I.B.4.-7. of the final permit. These parts are included to satisfy the regulatory requirements of:

- ° 40 CFR 125.60--Demonstrate compliance with water quality standards for 5-day biochemical oxygen demand (BOD₅) or dissolved oxygen (DO), suspended solids (SS) or turbidity, and pH, as well as other provisions of state law; compliance with water quality standards; protection and propagation of a balanced indigenous population of biota in the receiving water; and protection of recreational activities;
- ° 40 CFR 125.62--Biological monitoring program and water quality monitoring program;
- ° 40 CFR 125.64--Toxics control program.

Monitoring Strategy

The general approach of the monitoring program has been adjusted in the final permit to reflect the likelihood that impacts on the marine environment of Knik Arm due to the Municipality's discharge are extremely minor (1-7). This strategy is adopted based on careful analysis of available information which demonstrates that Knik Arm of Cook Inlet is a physically dominated system (verified by physical oceanographic studies, substrate analyses, and benthic sampling), and that no adverse effects attributable to the present discharge have been detected.

The sampling strategy has five primary aims.

The first aim is to characterize the discharge in detail by frequent effluent monitoring. Due to the diffuse link between the effluent and possible resultant impacts in Knik Arm (3-7), it is critical that the composition of the effluent be well-understood. This effort will allow EPA to:

(1) determine compliance with discharge limits designed to protect water quality and biota, (2) predict which pollutants are likely to be detected in the receiving environment, and (3) predict what the likely changes in water quality and the biota will be.

The second aim is to provide initially for restricted and focused monitoring in areas of greatest expected impact (e.g., within the zone of initial dilution [ZID] and intertidal depositional areas) (1-7).

The third aim is to insure that any evidence of impact in these areas will cause the monitoring programs to be expanded. These expanded programs are designed to measure the seasonal and/or areal extent of the impact (1-7).

The fourth aim is to address the possibility that, even though short-term impacts due to the discharge may not occur or be detected, long-term or gradual degradation of the marine environment in Knik Arm may occur. To address this concern, EPA has determined that consistent monitoring at intervals of every 2-3 years will be necessary and sufficient, over the course of the final permit and any future renewals, to provide information on long-term changes in receiving water quality, sediment chemistry, and intertidal communities.

The fifth aim of the overall monitoring strategy is to insure that useful, high quality data are provided for evaluating reissuance of the permit.

Changes Made to the Draft Permit

A summary of the monitoring strategy discussed above has been added to the final permit. The final permit allows monitoring programs to be adjusted (expanded or reduced, as appropriate) and requires them to be implemented by the next monitoring survey (4-3) whenever this is practicable, so that unnecessary delays in implementation can be avoided. The final permit also requires the Director to approve all methods used (1-10; 2-1). The monitoring program plan to be submitted by the permittee is described in the final permit. This plan must address the details of the monitoring program procedures, objectives, and QA/QC procedures (including detection limits and precision requirements; 2-33; 4-7) as well as how the data will be used to meet, test, and evaluate the objectives. For clarity, throughout Part I.B., the final permit requires that any materials submitted to EPA shall be submitted to the Director.

As requested by the state, the final permit provides that copies of all documents submitted to the Director (Water Division Director, EPA, Region 10) will be sent to the state as well, and that decisions to be made by the Director will be made in consultation with the state.

DATA CODING AND SUBMISSION REQUIREMENTS
(Final Permit = Part I.B.2.)

Objectives

The objective of the Data Coding and Submission Requirements is to insure that EPA is provided with high quality information, compatible with its national system of collecting, storing, and analyzing data gathered under the 301(h) program. Use of the Ocean Data Evaluation System (ODES) also promotes regional and national standardization of data organization, submission, and interpretation.

Changes Made to the Draft Permit

Data submission requirements in the draft permit have been amended to require submission of data tapes within two months of sample collection and submission of draft reports within an additional two months. This will allow time for: (1) the Municipality to complete the QA/QC procedures required by ODES following data submission and prior to data analyses, (2) the Municipality to submit the required reports following data analyses, and (3) EPA to review the analyzed data as soon as practicable prior to the initiation of subsequent phases of monitoring (2-2; 4-8,10). ODES is available and recommended for the Municipality's use in data analysis and report generation (4-9). Following review of the draft reports, the final permit allows the Director to request final reports. In addition, the final permit requires an annual written report that will compare data across sampling periods and between years. This report will be submitted by January 31 of each year.

DEFINITIONS
(Final Permit = Part I.B.3.)

Changes Made to the Draft Permit

This part has been expanded to define Toxic Pollutants, Pesticides, MPN (most probable number), and FC (Fecal Coliforms).

INFLUENT, EFFLUENT, AND SLUDGE MONITORING REQUIREMENTS
(Final Permit = Part I.B.4.)

Objectives

The Influent, Effluent, and Sludge Monitoring Requirements are designed to assure compliance with permit limitations and to meet the requirements of 40 CFR 125.62(a)(2)(i) which specifies that data must be provided to:

Evaluate the impact of the modified discharge on marine biota;

Demonstrate compliance with applicable water quality standards; and

Measure toxic substances and pesticides in the discharge (and the effectiveness of the toxics control program; 40 CFR 125.62(d)).

The frequency and extent of the overall monitoring program is determined by considering the applicant's rate of discharge, quantities of toxic pollutants discharged, and potentially significant impacts on receiving water quality, marine biota, and designated water uses (40 CFR 125.62(a)(iv)).

To meet these regulatory requirements, the Municipality's monitoring program includes monitoring for conventional pollutants, heavy metals, and other priority pollutants and pesticides.

Monitoring Program and Rationale

The following Table lists the parameters required by the monitoring program and groups them by purpose.

<u>Purpose</u>	<u>Parameters</u>
Determine compliance with permit conditions for effluent limits under <u>Part I.A.</u> and compliance with applicable water quality standards	Flow, pH, Oil and Grease, 5-day Biochemical Oxygen Demand (BOD ₅), Suspended Solids (SS), and Fecal Coliform Bacteria
Determine compliance with the Municipality's pretreatment program and the effectiveness of the toxics control program specified under <u>Parts I.B.7. and C.2.</u>	Toxic Pollutants and Pesticides, Heavy Metals, and Cyanide
Address plant efficiency	Those listed previously plus Temperature, Total Solids (TS), and Settleable Solids
Determine waste characteristics and flows for use in interpreting water quality and biological data	Those listed previously plus Dissolved Oxygen (DO), Alkalinity, Enterococci Bacteria, and Total Residual Chlorine

Changes Made to the Draft Permit

The following changes were made to the Effluent Monitoring Requirements specified in the draft permit.

-Part I.B.4.a. (Draft Permit = Part I.A.2.a.)

The final permit redefines Residual Chlorine as Total Residual Chlorine and allows this parameter to be measured either by using a continuous analyzer or by collecting grab samples every two to four hours, seven days per week (1-2).

EPA agrees that the sampling frequencies proposed by the Municipality for BOD₅ (4/week), SS (5/week), TS (4/week), and Fecal Coliform Bacteria (3/week) are sufficient to achieve the objectives of the effluent monitoring program. However, the final permit retains the requirement of daily monitoring of pH, DO, Settleable Solids, and Temperature since these measurements involve only a relatively small analytical effort (1-1). The final permit also requires that monitoring on a less-than-daily basis for BOD₅, SS, TS, and Fecal Coliform Bacteria shall be arranged so that each day of the week is represented, each month, and that monitoring for Oil and Grease, Heavy Metals, and Cyanide shall be arranged so that each day of the week is represented, each quarter (or each year, if monitoring frequency is reduced to monthly by the Director). This will produce more representative sampling by insuring that discharges are sampled during weekends. The final permit requires periodic weekend sampling to continue throughout the permit term, but allows a reduction if the monitoring objectives can still be met.

Total Solids (TS) will be measured in the sludge, prior to thickening, as a check on the Suspended Solids removal. The requirement to measure TS following thickening and prior to dewatering has been dropped because the measure of TS prior to sludge thickening will provide sufficient information on the efficiency of sludge removal.

Total Heavy Metals is redefined as Heavy Metals to remove any confusion of whether separate analyses or only one analysis is required (4-5). For purposes of reporting, each Heavy Metal will be reported as "total" rather than "total recoverable". Monitoring of Heavy Metals in the final permit is amended to include Arsenic (As) and Silver (Ag), because these metals were listed as present in the effluent by the Municipality in its application. The final permit requires Heavy Metals and Cyanide to be monitored weekly in the influent and effluent during the first and fourth years of the permit and monthly in years 2, 3, and 5. Each year, the permittee will address whether monthly sampling is adequate to meet the program objectives; if they are not met, weekly sampling will be required. So that comparable data can be obtained, the final permit requires sludge to be sampled for the analysis of Heavy Metals and Cyanide on a day when the influent and effluent are sampled.

Toxic Pollutants and Pesticides will be measured during four periods which correspond to the "seasons" present in Anchorage: winter-dry weather; spring breakup-wet or dry weather; and summer-wet and dry weather. This replaces the previous requirement of sampling during wet and dry weather in spring, summer, and fall.

In addition to performing metal and cyanide analyses (and occasionally, toxic organic analyses) of the influent and effluent, sludge analyses are being requested to determine the effectiveness of the Municipality's pretreatment program. Additionally, the data will be useful in assessing the levels and trends of toxicants in the sludge (1-5,28).

For completeness, the final permit includes the monitoring schedule for sampling the influent, effluent, and sludge for toxic pollutants and pesticides in Part I.B.4.a. (Influent, Effluent, and Sludge Monitoring Requirements) as well as in Part I.B.7. (Toxics Control Program Monitoring Requirements) (2-21; 4-4,6). Total Hydrocarbons (HC) and Total Aromatic Hydrocarbons will be computed and reported for each of these samples. These latter concentrations will be used to determine whether sampling for Total HC and Total Aromatic HC in receiving water (Part I.B.5.d.) is warranted.

Alkalinity will be measured monthly (rather than daily) between July and December during year 1 of the permit (rather than every year). This frequency will provide sufficient data when Table VI-11 of the Revised Technical Support Document (TSD; Tetra Tech 1982) is used to estimate pH values in the receiving water following initial dilution (1-3). The Technical Review Report (TRR; Tetra Tech 1984), which analyzed the Municipality's 301(h) application, indicated pH standards could be violated during times of low temperature and low pH depending on the effluent alkalinity. The results of the analyses using Table VI-11 of the TSD and the results of sampling pH in the receiving water (under Part I.B.5.d., Water Quality Monitoring Program) will be used to determine whether state pH standards are violated in the receiving water.

The final permit requires Oil and Grease concentration to be measured weekly rather than daily. This frequency is sufficient to meet the effluent monitoring program objective of whether the discharge of oil and grease is likely to contribute to the presence of a sheen on the surface of the receiving water (1-4).

To allow receiving water concentrations of Enterococci Bacteria to be compared to effluent concentrations, sampling of the effluent for Enterococci Bacteria is required whenever receiving water is sampled. The final permit requires samples for Fecal Coliform and Enterococci Bacteria to be collected in the effluent following chlorination.

-Part I.B.4.b. (Draft Permit = Part I.A.2.b.)

The language requiring composite samples to be flow weighted is omitted because it is included in the more detailed definition of 24-hr. composite sampling in Part I.B.3. (Definitions) of the final permit.

-Part I.B.4.c. (Draft Permit = Part I.A.2.c.)

This part also requires the most probable number (MPN) procedure to be used for analysis of bacteria samples. The membrane filter method is not recommended because counts based on this method can be 60-80 % lower than actual values (J. Vasconcelos, EPA Lab, Manchester, WA).

-Part I.B.4.d. (Draft Permit = Part I.A.2.d.)

This section is amended to require analysis of quality control samples as requested, instead of annually.

-Part I.B.4.e.

This section is added to the final permit. It refers the permittee to Part II.D. (Monitoring Reporting Requirements) to insure compliance with required submission dates.

-Part I.B.4.f.

This section is added to the final permit. It provides for replacement of the monitoring for fecal coliform by monitoring for enterococcus bacteria if enterococci bacteria standards are adopted.

WATER QUALITY MONITORING PROGRAM
(Final Permit = Part I.B.5.)

Objectives

This monitoring program must satisfy the requirement of 40 CFR 125.62(c) which requires data to be provided for evaluating compliance with applicable water quality standards and for measuring the presence of toxic pollutants which have been identified or reasonably may be expected to be present in the discharge. The data will also be used to determine compliance with permit terms and conditions and with 40 CFR 125.61 which requires water quality to be maintained to assure protection of public water supplies, the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife, and to safeguard recreational activities.

Monitoring Program

To determine compliance with water quality standards, receiving water will be monitored for DO, Turbidity, pH, and Fecal Coliform Bacteria, Color, Floating Solids, Visible Foam, Oily Wastes, and Total Chlorine Residual (Total Oxidants), and, if required by the Director, for Total Hydrocarbons, and Total Aromatic Hydrocarbons. Temperature and Salinity profiles of the water column, and Enterococci Bacteria concentrations in the surface waters, will also be measured.

If the discharge alters water quality, these impacts are most likely to be detected in or near to the Zone of Initial Dilution (ZID). Therefore, the water quality monitoring stations for the first year have been altered from the fixed stations listed in the draft permit (1-8). In the final permit, water quality sampling is required three times each year. At each of these periods, samples shall be collected during a minimum of 6 short cruises (three during a flood tide; three during the ebb tide immediately following) each of which begins at a fixed station in the center of the ZID and then follows the track of a drogue released at that point. Each year, the permittee will evaluate the monitoring data and determine whether this sampling approach is meeting the objectives of the water quality monitoring program; if not, then for the remainder of the final permit term, the program using fixed stations listed in the draft permit will be implemented, with certain amendments discussed separately below (Part I.B.5.b.(2)).

Changes Made to the Draft Permit

-Part I.B.5.b. (Draft Permit = Part I.B.2.b.)

This part as amended allows station locations to be modified upon approval by the Director, and refers to section (4) and Figure 1 (4-33) for station locations.

Part I.B.5.b.(1). The final permit specifies the following initial program in section (1). Several cruises will be conducted. Periodically during each cruise, the exact position of the vessel will be recorded, water quality parameters will be measured, and samples will be collected at the surface, mid-depth, and bottom at each station to meet the requirements of Part I.B.5.d. Stations will include, but not be limited

to: above the diffuser (Station 0); as close to the ZID boundary as practicable (Station 1); the channel in Knik Arm and Cook Inlet; the shallow subtidal; and stations sampled during three flood-tide control cruises at similar depths and distances from a fixed station (Station C1) having the same water depth as the outfall and located due north across Knik Arm from Pt. Woronzof, near Pt. MacKenzie. As described under the Monitoring Program section above, this part requires the permittee to evaluate the first year's data and the Director to determine whether the fixed station sampling program in section (2) will be implemented.

Part I.B.5.b.(2). The fixed offshore stations listed in the draft permit are amended as follows. If this program is implemented by the Director, initial sampling will occur at the ZID boundary (Station 1), approximately 20 m beyond the boundary (50 m from the diffuser; Station 2 [4-12]) and at several stations (at least 3 of the following, Stations 3, 4, 6, 9, 10, and 12; to be selected by the Director) with water depths of approximately 6 m at distances of 250 m, 750 m, and 2000 m from the diffuser. Control stations with water depths of 3.7 m (Station C1, for comparison with Station 1 [4-11]) and 6 m (Station C2, for comparisons involving Stations 3, 4, 6, 9, 10, and 12) will be located at the mouth of Knik Arm near Pt. MacKenzie (4-13). Upon review of a year's monitoring data collected under this program, the permittee will address whether the objectives of the program are being met. Based on this review, the Director may adjust the sampling frequency or station locations, remove stations from the program, or require monitoring at any or all of the offshore stations listed in section (4) (Stations 0-13, except Station 8, which may be influenced by the flow from Fish Creek and therefore, is not included in the final permit, and Stations C1-C3).

Part I.B.5.b.(3). Monitoring for bacteria at eight fixed intertidal stations is specified in the final permit. Station 15 of the draft permit is dropped and station C4 is added (2-3; 3-1). Because a low within-station variance is likely, two, rather than three, replicate samples per station for bacterial analyses are required (1-12). Sampling will occur each summer at all stations and in spring and fall of years 1 and 4 at five stations to examine seasonal changes.

Part I.B.5.b.(4). All station depths are given in meters (below MLLW) in the final permit. For clarity, depths are added to all stations, the location of Station 1 is labelled "ZID boundary", and the location of station 2 is labelled "Beyond the ZID" (4-12). Stations 8 and 15 of the draft permit have been omitted due to their proximity to Fish Creek. In the final permit, two control stations C1 and C2, at depths of 3.7 m and 6 m, are added; Station C4 replaces Station 15; and Station C3 replaces station 14. The final permit makes it clear that station locations 16-22 and C1-C4 are guidelines and that exact locations must be approved by the Director and recorded in all data submissions.

-Part I.B.5.c. (Draft Permit = Part I.B.2.c.)

The final permit defines further the criteria the Director will use when determining whether to reduce water quality sampling to monitoring only during summer in remaining years. As part of this determination, the permittee must demonstrate that there is no substantial change in the measured parameters

with season. The Director will use this analysis as a basis to decide whether a longer baseline monitoring program, designed to detect statistically and ecologically significant changes, is necessary (2-4;3-2). The Director will also consider whether water quality within and at the boundary of the ZID is within receiving water quality standards or is within the range of values measured at control stations (1-9,11).

-Part I.B.5.d. (Draft Permit = Part I.B.2.d.)

This part clarifies which parameters will be measured and at which depths. At each station, surface water samples will be collected for: (1) shipboard analyses of DO, Color, Turbidity, and presence of Floating Solids, Visible Foam, and Oily Wastes; and (2) laboratory analyses of Fecal Coliform Bacteria, Enterococci Bacteria, Total Residual Chlorine (Total Oxidants), and, when required, Total Hydrocarbons, and Total Aromatic Hydrocarbons. Mid-depth and bottom water samples will also be collected for shipboard analyses of DO and Turbidity. Profiling of Temperature, Salinity, and pH will be conducted at each station. Laboratory analyses will be conducted for samples collected from at least 3 cruises from each of the flood, ebb, and control-flood tidal stages.

Measurement of SS and BOD₅ in receiving water is not necessary because: (1) natural solids loadings (concentrations) are so great that they can only be decreased by the effluent and (2) BOD₅ loadings are predicted to have no effect on DO levels. Furthermore, the final permit requires monitoring of both Turbidity and DO at all stations, which reflect both the BOD₅ and SS loadings which result from the discharged effluent. Following submission of sampling data on DO and Turbidity, the Director will determine whether BOD₅ and SS should be measured directly in the receiving water (2-5; 3-3,4).

In the final permit, light transmittance measurements are not required because of deployment problems (high current drag and risk of entanglement of the line with the vessel's propeller). Measurements of turbidity will be sufficient. Turbidity shall be measured at all stations (4-14). Also, because secchi disk depths are uniformly on the order of 0.5 ft in Knik Arm, their measurement is not required by the final permit (1-13).

Profile sampling for pH is practicable and the results will be used to determine compliance with water quality standards.

The final permit requires the monitoring of the following additional parameters in surface waters (above 0.5 m): Total Residual Chlorine (measured as Total Oxidants), Total Hydrocarbons, and Total Aromatic Hydrocarbons (4-15). The permittee will compare values from the measurement of these parameters with state standards. Monitoring for Total Hydrocarbons, and Total Aromatic Hydrocarbons will occur only if effluent concentrations indicate that water quality standards applicable to that parameter are approached (i.e., within 75% of the standard) after the dilution ratio of 25:1 is applied. The final permit also requires that the presence or absence of Floating Solids, Visible Foam in other than trace amounts, or Oily Wastes which produce a sheen on the surface of the receiving water and Color be reported for each station when surface samples are collected (4-16). This will insure that the provisions of Part I.A.3. of the final permit which implement these state standards are met.

Profiles of temperature and salinity are required in order to compute density profiles. These profiles will describe the water masses within Knik Arm and will be examined for evidence of stratification or mixing and used in any future modeling of dilution. Because of the extremely strong currents, and because samples will be taken while the vessel is tracking the path of drogues, the requirement for replicate profiles or replicate bacterial samples is not practicable (1-12).

Epidemiological evidence demonstrates that the enterococci are a group of bacteria that provide a better indicator of recreational water quality than fecal coliform bacteria. Guideline standards have been proposed (FR Vol. 49, No. 102, p. 21987-21988) based on the relationship between enterococci densities and the swimming-associated rate for gastrointestinal illness. While water contact recreation is rare in areas near the Municipality's outfall, measurement of enterococci densities will allow EPA to evaluate water quality using an indicator group of species most closely associated with fecal wastes of humans (1-14). The final permit allows monitoring for fecal coliform bacteria to be dropped if an enterococci bacteria standard is adopted.

Sampling the surface microlayer is an exacting procedure unlikely to be performed successfully from the side of a vessel in Knik Arm. Therefore, the final permit specifies monitoring in a standard manner, to be approved by the Director, whereby the water sample shall be collected from within the surface layer (15-30 cm). Sterilized widemouth polyethylene containers are recommended. Although replicate samples for bacteria at offshore stations are not required, the final permit specifies that two replicate samples shall be taken at all intertidal stations.

-Part I.B.5.e. (Draft Permit = Part I.B.2.e.)

This part has been revised to describe the contents of the required reports and to ensure data will be submitted as required by Part I.B.2.

BIOLOGICAL MONITORING PROGRAM
(Final Permit = Part I.B.6.)

General Objectives

The biological monitoring program is included to meet the requirements of 40 CFR 125.62(b). Under this regulation, data on biological communities, bioaccumulation, sediments, and fisheries must be provided so that the impact of the modified discharge on the marine biota can be evaluated. This monitoring must also meet the requirements of 40 CFR 125.61(c) which provides that, for saline estuarine water:

- A balanced indigenous population of organisms must exist within and beyond the ZID, as well as in areas of actual or potential impact
- No adverse biological impacts can occur within the ZID (migratory pathways must be maintained; toxic pollutants and pesticides must not accumulate)

General Monitoring Program
(Final Permit = Part I.B.6.a.)

To meet the above objectives, the biological monitoring program includes three components: benthic macroinvertebrate community surveys, sediment analyses, and studies of bioaccumulation in infauna. In keeping with the overall monitoring strategy, this program focuses initially on monitoring in areas of expected greatest impact, and then provides for adjustment of the program following review of the initial results.

Changes Made to the Draft Permit

The final permit requires implementation of benthic and sediment monitoring (including sediment pollutants) in years 1 and 4 of the permit in conjunction with the sampling times specified for the water quality monitoring program (Part I.B.5.c.). Because the benthic surveys are required in year 1 and 4 of the permit, they are no longer contingent on results of the effluent or sediment sampling program (2-24; 3-12). Also, the monitoring of sediment pollutants is no longer contingent on the results of the effluent sampling program (1-15; 2-6,22; 3-5). Furthermore, the bioaccumulation studies are no longer contingent on results from benthic surveys and sediment pollutant analyses although the benthic survey data will be used to select an appropriate test organism.

The final permit provides that, throughout Part I.B.6., reporting requirements for each sampling period and each year will be consistent with Part I.B.2. Finally, the permit states that adjustments to this monitoring program (i.e., stations, frequency, and/or replication) may be required by the Director following a review of any data submitted as part of this program. The criteria for adjusting each component are included in the appropriate subsections.

BENTHIC MACROINVERTEBRATE SURVEYS
(Final Permit = Part I.B.6.b.)

Objectives and Monitoring Program

Benthic macroinvertebrates include many sedentary species whose abundances may change as a result of pollutant stress. While no adverse impacts on the impoverished benthic community in Knik Arm are expected as a result of the Municipality's discharge, the benthic community must be monitored to provide data: (1) for a more current baseline, (2) from depositional areas where inadequate baseline data are available and maximum impacts of the discharge are expected to occur, and (3) for evaluation of any gradual changes prior to permit renewal (2-7; 3-6,8; 4-2,23). Intertidal and subtidal benthic communities will be monitored. Although previous studies on the hydrography and biology of Knik Arm indicate that intertidal benthic communities are most likely to be affected by the discharge and most practicable to monitor, limited subtidal monitoring will be conducted to provide a basis for drawing conclusions about the effect of the discharge at the boundary of the ZID (4-24).

Changes Made to the Draft Permit

This section (Intertidal Benthic Surveys) has been retitled Benthic Macroinvertebrate Surveys and precedes the Sediment Analyses and Bioaccumulation sections.

-Part I.B.6.b.(1). The final permit includes the objectives of the subtidal monitoring as described above (2-9). Because the surveys will be implemented at least twice during the permit term (see Part I.B.6.b.(2)), the contingent language providing for implementation has been omitted.

-Part I.B.6.b.(2). The final permit provides that three intertidal and, if practicable, two subtidal stations (ZID boundary and control; 4-24) will be monitored initially (2-8) in summer in Years 1 and 4 of the permit. Control stations are located across from Pt. Woronzof, away from the influence of Fish Creek (1-18). This program, although involving fewer stations from that specified in the draft permit, will be implemented at least twice during the permit term and will meet the objectives described above (1-19). Ten replicate cores will be collected (4-25), if possible. The core depth will depend on the sediment type (deeper in mud or sand - 10 cm; and shallower in gravel - 4-10 cm). It is expected that grab sampling will be difficult in subtidal, cobble areas. Therefore, if practicable, five replicate samples will be collected at each subtidal station by using gear that will provide at least semi-quantitative samples of the benthic community.

Initially, for sampling at the intertidal stations, the final permit specifies that a single tidal height will be chosen. However, the question of whether to use a sampling design involving stratification by tidal height, vegetation, or obvious discontinuities, will be addressed as part of the initial survey (2-10). In addition, the final permit requires sediment samples to be collected and processed for TVS and granulometric analyses whenever benthic samples are collected.

-Part I.B.6.b.(3). This section in the final permit includes all requirements concerning "Adjusted Monitoring". The adjustment for core size following the initial survey, has been dropped (2-10). As part of the criteria for adjusting the benthic monitoring, the permittee will address whether the objectives of the benthic macroinvertebrate surveys are being met.

-Part I.B.6.b.(4). In the final permit, section (3) of the draft permit becomes section (4). So that data may be compared with that collected in other studies, the final permit requires faunal analysis using a graded set of sieves (0.5 and 1.00 mm). Because the QA/QC program plan will address taxonomic verification, the final permit no longer requires the Director to be consulted on taxonomic problems. Along with species diversity, a simpler measure of community structure, species dominance, is required in the final permit. The Infaunal Trophic Index is judged unnecessary and is omitted in the final permit (4-26). With the reduced number of stations, the requirement for linear, curvilinear, and covariance analyses is replaced with a comparison of parameters as a function of distance from the outfall in the context of the Pearson-Rosenberg model (2-11,12).

SEDIMENT ANALYSES

(Final Permit =Part I.B.6.c.)

Objectives and Monitoring Program

The physical and chemical characteristics of sediments greatly influence the composition of benthic communities. Measurement of the total volatile solids content (TVS) and pollutant concentrations allows inferences to be made about the fate of solids and their absorbed pollutants in sewage effluent. Sediment pollutant analyses will be used to determine whether any toxic compounds are accumulating in depositional sediments in Knik Arm. The results of sediment pollutant analyses will be carefully compared with analyses of effluent pollutants. TVS and granulometric analyses will allow pollutants in sediments to be normalized, if necessary, to particle size and organic content, for comparison across stations. Because of the tremendous current scour and resuspension, sediments in Knik Arm are not expected to show changes in organic enrichment or grain size distribution that are attributable to the effluent (1-16; 3-11). However, for the reasons cited above (i.e., to characterize substrate types and standardize pollutant concentrations) and to provide a baseline for future comparisons, sediment granulometry and TVS must be measured whenever samples for sediment pollutants are collected or whenever stations are added to the benthic surveys (1-17). Replicate samples are required so that the variance of seasonal values can be estimated.

Changes Made to the Draft Permit

-Part I.B.6.c.(1). This section of the final permit includes the objectives specified above.

-Part I.B.6.c.(2). The final permit specifies that samples will be collected at the same benthic survey stations and fixed tidal height (4-21) described in Part I.B.6.b.(2) (4-18). For samples collected from gravel on cobble substrates, analyses for pollutants will be done only on the finer components.

For clarification, this part states that two samples will be collected at random at each station (4-17). The analysis of pollutants in sediments as required by the final permit is no longer contingent on effluent pollutant concentrations (4-19,20,22). Sampling for granulometric analyses is reduced in the final permit to those stations and times when sampling occurs for benthic macroinvertebrates, whereas TVS sampling is more frequent. Sampling frequency is specified as three times per year in year 1 and once per year (summer) in year 4 for TVS analyses and once per year (summer) for granulometric and pollutant analyses, in Years 1 and 4 of the final permit (2-25,26). The final permit provides for flexibility in the test procedures used to perform the analyses for toxic pollutants and pesticides by allowing the Director to approve methods other than those specified in 40 CFR Part 136. This insures that improved, state-of-the-art procedures can be implemented.

-Part I.B.6.c.(3). This section has been added to the final permit. It includes all requirements concerning adjustments to the Sediment Analyses monitoring program. It provides that, following examination of any submitted data, the Director may adjust the monitoring frequency and/or stations. The permittee will address whether the effluent is contributing to increased TVS and/or pollutant concentrations in depositional areas and whether seasonal sampling is warranted; if so, the Director may implement an expanded program. So that a description of the benthic environment will be provided, the final permit requires sediment samples to be analyzed for TVS and granulometry whenever additional benthic monitoring stations are specified. The final permit also specifies that these analyses must be conducted whenever sediment samples are analyzed for toxic pollutants and pesticides.

BIOACCUMULATION

(Final Permit = Part I.B.6.d.)

Objectives and Monitoring Program

Organisms living in or on unconsolidated sediments such as sand or mud are subject to direct contact with deposited sewage solids. These solids may be contaminated with absorbed pollutants. Infaunal organisms, especially deposit feeders, which ingest and process these particles, serve as food for groups such as demersal fish. By this link, toxic pollutants and pesticides can be transferred to higher trophic levels.

The analysis of the tissues of a test organism (such as a deposit-feeding bivalve) is an appropriate approach to detecting whether bioaccumulation of pollutants is occurring in the benthic community in the receiving waters of Knik Arm. However, because of low toxic pollutant and pesticide loading and high mixing, bioaccumulation is likely to be minimal (3-10). Because composite samples are likely to be required to furnish sufficient biomass for tissue analysis, the proposed bioaccumulation study will not attempt to document the natural variability of pollutant concentrations, but rather will provide an estimate of the mean concentration. The tissue concentrations will be used to compare control, depositional, and if practicable, ZID boundary stations.

The bioaccumulation study in the permit will be implemented in years 2 and 4. Previous efforts to collect sufficient bivalve tissue on which to perform pollutant analyses have failed (1-20; 3-9). Therefore, before this study is implemented, the permittee will review the QA/QC program plan, data from the benthic macroinvertebrate surveys, as well as any other sampling efforts designed to aid in the selection of a suitable test organism. If projections based on the surveys demonstrate that sufficient biomass cannot be collected after sampling a total of 3 m² for intertidal stations, or if sampling subtidal stations is not practicable, then such stations will not be part of the field study. A minimum of two stations (which are to include the intertidal control station and one of the intertidal stations subject to the impact of the effluent) must be available for the field study to be implemented.

If the minimum number of stations are not available, then a laboratory study will be implemented (3-10). Details of the laboratory study will be supplied in the QA/QC program plan. As a minimum, the plan will identify the test organism, control and test conditions, replication, study duration, and any necessary preliminary testing. The methods that will be used in this study or in the field study must be approved by the Director before either study is implemented.

Changes Made to the Draft Permit

The final permit incorporates the above objectives and determinations that will be made, as well as the main components of the laboratory bioaccumulation study. The permit requires detection limits (as required to meet permit requirements) to be reported along with the names, concentrations, and sample type of all toxic pollutants and pesticides looked for in tissue samples as well as in the most recent sediment and effluent samples (2-29; 4-27,28). In addition, the reports will be submitted as specified in Part I.B.2. The final permit makes it clear that two composite samples are required for each of the stations (2-28) and that either the field or laboratory bioaccumulation study will be conducted during summer of years 2 and 4 of the permit. Expanded monitoring may be required if the Director determines that a bioaccumulation study in years 3 or 5 of the permit is warranted. Part of the basis for this decision will be whether any substantial bioaccumulation has been detected (2-30).

TOXICS CONTROL PROGRAM MONITORING REQUIREMENTS
(Final Permit = Part I.B.7.)

General Objectives

The Toxics Control Program Monitoring Requirements are designed to provide data to insure compliance with those parts of 40 CFR 125.62(d) and 125.64 that require monitoring or sampling.

40 CFR 125.62(d) requires data to be provided which measure: (1) toxic substances and pesticides in the effluent, and (2) the effectiveness of the toxics control program.

40 CFR 125.64 requires the implementation of a toxics control program and, among other requirements, provides for chemical analysis of the discharge.

Monitoring Program

To meet the sampling requirements for the above objectives, the monitoring program comprises two parts: Chemical Analyses and Pretreatment Program Sampling Requirements.

CHEMICAL ANALYSES
(Final Permit = Part I.B.7.a.)

Objectives and Monitoring Program

Frequent monitoring of the influent and effluent for toxic pollutants and pesticides is crucial to the overall monitoring program for several reasons (1-27). First, these data are necessary to determine the effectiveness of the toxic control monitoring program which includes the pretreatment requirements discussed below (1-24). Second, these data are used by the Director in his decision to adjust the monitoring program for sediment pollutant analyses Part I.B.6.c.(3).

These data are also used by the Municipality in its report comparing results from tissue, sediment, and effluent analyses (Part I.B.6.d.(1)). Last, because the physically controlled environment of Knik Arm produces rapid dispersion of the effluent, measurements of receiving water, sediments, or organisms are unlikely to detect any significant pollutant loadings. Therefore, the best means for identifying the input of toxic pollutants and pesticides into Knik Arm is through frequent effluent analyses. Furthermore, in considering the long-term health of Knik Arm, an accurate and detailed record of pollutant loadings is necessary so that the causes of any gradual degradation that may occur can be effectively investigated.

Changes Made to the Draft Permit

For clarification, sections 4.a.-d. of the draft permit have been combined and condensed under 7.a., labeled "Chemical Analyses" (1-21). Data reporting requirements (Part I.B.4.d. of the draft permit) have been made consistent with Part I.B.2. of the final permit and moved to the second paragraph under section 7.a. Influent and effluent samples will be collected during both wet

and dry weather in summer, during wet or dry weather during spring breakup, and during dry weather in winter in years 1 and 4, and during wet and dry weather in summer in years 2, 3, and 5 (1-22; 4-29). The final permit makes it clear that a total of four influent samples and four effluent samples will be taken in years 1 and 4 and a total of two influent and two effluent samples in years 2, 3, and 5. These samples will be analyzed for toxic pollutants and pesticides (4-30).

The final permit states that toxic pollutant and pesticide concentrations at the ZID boundary will be estimated from effluent concentrations, by applying a 25:1 dilution ratio (2-31) (or a lesser dilution ratio, if so determined from water quality monitoring). If any toxic pollutant or pesticide has a concentration at the ZID boundary that exceeds 25% of the federal water quality criteria for that pollutant or if any pollutant approaches the concentration documented to cause adverse biological impacts (2-22,32), that compound, once so identified, will be measured every spring, summer, and winter for the remainder of the permit (1-23; 4-31). Therefore, in the final permit, pollutants found in a concentration below the "25%" standard will only be monitored each summer and in spring and winter of years 1 and 4 (1-25). The final permit specifies monitoring of sludge in summer during dry weather flow and in winter (during wet weather flow, if possible) each year (1-22).

Section 4.c. of the draft permit is included in section 7.a. of the final permit. This part clarifies the procedures for identifying the next ten highest peaks on the GC/MS ion plot, and emphasizes that this requirement is added as a screening tool for potentially toxic compounds (1-26).

The final permit includes the Pretreatment Program Sampling Requirements as section 7.b. Sludge monitoring is included for reasons discussed previously for Part I.B.4.a. (Influent, Effluent, and Sludge Monitoring Requirements) (1-28).

PRETREATMENT PROGRAM SAMPLING REQUIREMENTS (Final Permit = Part I.B.7.b.)

This part is adjusted, for completeness, to include the toxic pollutant and pesticide monitoring as part of the Pretreatment Program Sampling Requirements.

SUMMARY TABLES (Final Permit = Part I.B.8.)

The original table has been expanded to include program parts and station numbers (where appropriate, 4-32) and to match monitoring requirements discussed throughout Part I.B. (1-29; 2-14,34). In particular, possible expansions and reductions are noted in the table. A second table has been added to indicate when program component approvals and adjustments will be initiated, what these approvals and adjustments will be, what their basis is, and which part of the permit refers to each decision.

SECTION IV

ADDITIONAL REQUIREMENTS
(Final Permit = Part I.C.)General Objectives

This part is added to the final permit to include the requirements to construct the diffuser and to implement the Toxics Control Program.

Toxics Control Program
(Final Permit = Part I.C.2.)

This program is designed to meet the requirements of 40 CFR 125.64(b)-(d) and therefore consists of three parts: Industrial User Survey updating (also covered in the next part), Pretreatment Program Requirements, and Nonindustrial Source Control Program.

-Part I.C.2.a. (Industrial User Survey). This part requires the permittee to update its industrial user survey annually in accordance with the appropriate sections in the Pretreatment Program.

-Part I.C.2.b. (Pretreatment Program Requirements). The pretreatment program requirements (sampling, general, reporting) are incorporated in this permit to satisfy the intent of 40 CFR 403, General Pretreatment Regulations. Particularly, 40 CFR Part 403.8(c) requires the EPA to reissue or modify a POTW's permit to incorporate pretreatment implementation conditions. This Region, with the aid of guidance from EPA Headquarters has developed specific conditions in POTW permits to insure that POTWs fully understand their respective implementation responsibilities. Each permit issued to a POTW by this Region contains similar implementation conditions (1-33).

In response to assessment of resources necessary to implement the pretreatment program, the municipality, as part of its program development, was required to evaluate its funding and staffing needs. The Region has shared with the municipality copies of program development guidance and implementation guidance to assist the staff in becoming more familiar with program requirements, which, in turn, should allow the municipality to reassess their resource needs. Additionally, following a pretreatment audit this year the Agency evaluated the municipality's program and made appropriate recommendations for improvement. Technical assistance has been available to the Municipality throughout this time (1-33).

The term "industrial" has been defined under the pretreatment program as nondomestic users. Consequently, this includes categorical industries, non-categorical industries, and commercial users that could discharge process wastewaters (1-34).

Part I.C.2.b.(2) of the permit relates to development of an implementation manual. In response to the municipality's concern regarding needing a year to issue discharge permits, the manual can specify the time frame for issuance of the permit. Our main concern is that the municipality develop the operating

procedures within 6 months which we believe is reasonable. One portion of the manual will deal with permitting of users and the time frame for conducting this process. The Regional Office will offer to assist the municipality in the task of developing the necessary procedures and implementing them (1-37).

As specified in Part I.C.2.b.(5) of the final permit, nine months is reasonable time for the municipality to develop a spill prevention program (1-38). Presently, the municipality's code provides it with sufficient legal authority to regulate or control spills or slug discharges into the system. The Regional office is preparing a guidance manual that will assist the municipality in developing a tailor-made program.

Changes Made to the Draft Permit

Parts III.I. and II.E. of the draft permit have been moved to this part (Part I.C.2.b.) in the final permit to consolidate the pretreatment requirements.

Part I.C.2.b.(1)(b). of the final permit has been modified to require that discharge permits be issued within one year of the effective date of the NPDES permit. A note has been added indicating that this does not relieve the municipality from insuring compliance by NRDC type industries with pretreatment requirements established by EPA (1-35).

Amendments have been made to Parts I.C.2.b.(1)(c), b.(4), b.(6), and b.(6)(b) so that they refer to the appropriate parts of the final permit.

To accommodate the municipality's comment, Part I.C.2.b.(1)(d) has been modified to require monitoring categorical industries at least two times per year and non-categorical industries at least one time per year (1-36).

Part I.C.2.c. (Nonindustrial Source Control Program)

Objectives

This program is designed to meet the requirements of 40 CFR 125.64(d) which requires a program to minimize the entrance of nonindustrial toxic pollutants and pesticides into the Municipality's facility, and requires this program to be implemented within 18 months after permit issuance.

Program

The program includes the following five parts:

- develop and adopt ordinances to control the introduction of pollutants into the facility
- develop disposal guidelines (stating which pollutants can be discharged and identifying alternative disposal methods for prohibited pollutants)
- implement the control program as contained in the pretreatment program
- provide alternative disposal methods
- adopt a hazardous waste management plan for sources which generate small quantities of waste

Changes Made to the Draft Permit

The time required for implementation has been increased to six months. This increase will be adequate to allow the Municipality to meet its November 1985 commitment to adopt ordinances following completion of the August 1985 Control Program Report by its consultant (1-31). The draft permit has been updated by the addition to and the expansion of the nonindustrial source control program to require the five-part plan specified above (1-30,32).

An annual report is required which will document the status and success of this program.

SECTION V

COMPLIANCE SCHEDULES
(Final Permit = Part I.D.)

The compliance schedules include dates for Construction (of the diffuser), the Toxics Control Program, and Monitoring Reports. The last schedule refers back to the summary of the monitoring program requirements for specific details and emphasizes the general nature of the reporting requirements (i.e., data are to be submitted on tapes within two months, as draft reports within four, as final reports thereafter if requested by the Director, and as part of an annual report).